KRTM 20   Contrast scanner RGB

12 mm
20 mm
50 mm

12 - 30 V
DC

25 kHz

- Freely programmable via protocol interface
- Freely adjustable transmitter colour, amplification and switching threshold
- Response time digital/analogue: 20µs/6.25µs
- Analogue and digital output
- Parameterisation input

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IP 67

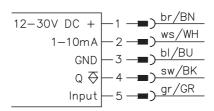### Accessories:
(available separately)

- M12 connectors, 5-pin (KD …)
- Ready-made cables (K-D …)
- Interchangeable objectives
- Tool for changing objectives

Dimensioned drawing

A   Light spot orientation vertical
B   Optical axis
C   M5/5.5mm deep
D   Scanning range
E   Front
F   Head

Electrical connection

12–30V DC +	1	br/BN
1–10mA	2	ws/WH
GND	3	bl/BU
Q	4	sw/BK
Input	5	gr/GR

We reserve the right to make changes • fmt_krt10gb.fm

Specifications

Optical data
Scanning range with objective 1 (accessory)	12 mm ± 1 mm
Scanning range with objective 2	20 mm ± 2 mm
Scanning range with objective 3 (accessory)	50 mm ± 5 mm
Light spot dimensions with objective 1	3.0 mm x 1.0 mm
Light spot dimensions with objective 2	4.0 mm x 1.2 mm
Light spot dimensions with objective 3	10.0 mm x 2.0 mm
Light spot orientation	vertical
Light source	LEDs (red, green, blue)

Timing
Digital switching frequency	max. 25 kHz
Response time digital/analogue	min. 20 µs/6.25 µs
Delay before start-up	$\leq$ 250 ms

Electrical data
Operating voltage U_B	12 … 30 VDC (incl. residual ripple)
Residual ripple	$\leq$ 15% of U_B
Switching output	PNP
Function characteristics	light switching
Analogue output	1 … 10 mA
Signal voltage high/low	$\geq (U_B-2V)/\leq 2V$
Output current	max. 100 mA
Bias current	$\leq$ 60 mA

Indicators
LED green 1	ON "ready"
LED green 2	without function
LED green 3	without function
LED yellow	Q/T "object detected"
LED yellow flashing	Q/T "device error, teach error"

Keyboard
Delay button	locked (see remarks)
L/D button	locked (see remarks)
Teach button	locked

Mechanical data
Housing	diecast zinc
Optics cover	glass
Weight	300 g
Connection type	M12 connector, stainless steel, 5-pin

Environmental data
Ambient temp. (operation/storage)	-25°C … +60°C/-40°C … +70°C
Protection class	IP 67
LED class	1 (acc. to EN 60825-1)
VDE safety class	II
Protective circuit [1]	2, 3
Standards applied	IEC 60947-5-2

Options
Input for parameterisation
PNP: active / not active	U_B/0V or not connected

1) 2=polarity reversal protection, 3=short-circuit protection for all outputs

Order guide

See section **4. Preferred types**

Tables

Diagrams

Remarks

- With shiny objects, the sensor is to be mounted at an angle to the object surface.

- The objectives and objective covers must not be removed.

- Keyboard is disabled.

- Button LEDs must be "OFF".

- L/D and Delay buttons
  - **KRTM 20…-0001-S12**: Dynamic keyboard locking (operable for approx. 10s after power-on).
  - **KRTM 20…-0002-S12**: Static keyboard locking (not operable).

KRTM 20

1. Function principle of the contrast scanner

This contrast scanner is a device which, with the aid of multiple transmitter colours (red, green, blue), can differentiate between extremely small differences in contrast (grey tones). A protocol interface allows the transmitter colour, amplification and switching threshold to be freely programmed. Additionally, all internal values (including analogue value) can be read back via this protocol interface.

As a result, the primary control can influence all sensor properties and also read back the actual measurement values in digital form. The switching threshold can also be freely adapted.
Once parameterisation has been completed, the sensor functions as a standard contrast scanner and outputs the measurement values via the analogue output and switching output.
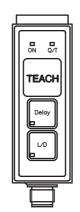
Each transmitter colour consists of 4 LEDs. A longish light spot with four points is formed in the focal point.
This very small, extremely bright light spot guarantees a high repeatability and positioning accuracy. For the case that the marker or background is not optimally printed, the light spot can be focused by slightly changing the scanning distance in such a way that a homogeneous, rectangular light spot is formed.

2. Controls and indicators

LED ON (green) for "Ready"

LED Delay (green) without function
(LED=OFF)

LED Q/T (yellow) for "Object detected"
and "Error display" (flashing)

LED L/D (green) without function
(LED=OFF)

3. Signal response

| Data pulses: | 3ms = **1**, 6ms = **0** | (High level) |
| | Pause = 3ms | (Low level) |

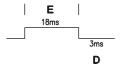| Adjustable values: | Switching threshold: | 0 … 127 (Bit0 … Bit6) |
	Transmitter colour:	1 … 3 (Bit0 … Bit1), 1 = Red, 2 = Green, 3 = Blue
	Amplification level:	0 … 8 (Bit0 … Bit7)
	Analogue value:	0 … 255 (Bit0 … Bit7)

Parameterisation of switching threshold and transmitter colour:

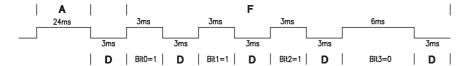| A | Start |
B	Switching threshold
C	Colour = blue
D	Pause
E	Request
F	Amplification level 7

Request for switching threshold:

Acknowledgement of switching threshold and transmitter colour:

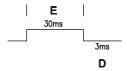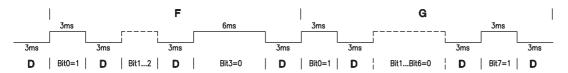**Parameterisation of amplification level:**

A	Start
B	Switching threshold
C	Colour = blue
D	Pause
E	Request
F	Amplification level = 7
G	Analogue value = 129

Request for amplification level and analogue value:

Acknowledgement of amplification level and analogue value:

4. Preferred types

Selection table Equipment ↓	Order code →	KRTM 20M/V-20-0001-S12 Part No. 500 35674	KRTM 20M/V-20-0002-S12 Part No. 501 09183										
Scanning range	12mm												
	20mm	●	●										
	50mm												
Transmitter colour	RGB	●	●										
	green												
Light spot orientation	vertical	●	●										
	horizontal												
	round												
Optical outlet	front												
	head	●	●										
Output wiring	PNP	●	●										
	NPN												
	analogue current	●	●										
Other features	programmable via protocol interface	●	●										
	static keyboard locking		●										
	dynamic keyboard locking	●											

Additional types on request